

**Middle Rio Grande Endangered Species Collaborative Program (MRGESCP)
Science & Technical (S&T) Ad Hoc Group Charge
*Rio Grande Silvery Minnow Conceptual Ecological Model/Genetics Ad Hoc***

Approved by Science and Adaptive Management Committee (SAMC) on April 22, 2021.

Parent Committee

Science and Adaptive Management Committee.

Ad Hoc Group Charge

Identify a series of genetics-related components that inform, and are informed by, the life history characteristics of the Rio Grande silvery minnow (RGSM), propagation and augmentation of the species, and environmental influences in the Middle Rio Grande (MRG). Incorporate these components into the conceptual ecological model (CEM) for the RGSM, found in Appendix B of the MRGESCP 2020 Science and Adaptive Management Plan (WEST 2020).

Membership

A. *Criteria for membership*

- Knowledge of RGSM genetics, life history and ecology within the Middle Rio Grande;
- Familiarity with MRGESCP Science and Adaptive Management Plan (WEST 2020), RGSM Genetics and Propagation Plan (CABQ et al. 2018a), and RGSM Augmentation Plan (CABQ et al. 2018b).

B. *Member List*

Wade Wilson (Lead), U.S. Fish and Wildlife Service

Jane Rogosch, Cooperative Fish & Wildlife Research Unit, Texas Tech University

Megan Osborne, University of New Mexico

Eric Gonzales, Bureau of Reclamation

Iterative Task Development

Background

RGSM genetic data guides and informs the propagation and augmentation plans. Thus, this work is also integral to our understanding of population dynamics. Any representation of the relationship of RGSM abundance to environmental influences, therefore, should also include factors that affect the genetic integrity and diversity of augmented populations. The current CEM for RGSM fails to capture the full suite of threats to the recovery of the species. The task described below will remedy these omissions and help to inform adaptive management strategies for RGSM recovery.

Specifically, this task addresses Recommendation 5 from the Fraser et al. Independent Science Panel on RGSM Genetics (AFWE&I 2016):

“The Science Workgroup (led by the Program) and the Genetics Workgroup (led by the USFWS) should integrate the genetics data and the decision-making more carefully. Specifically, there should be more translation of the genetics research into the adaptive management process, hatchery broodstock practices, and the integration of the past 15 years of research (genetics and ecology combined).”

Tasks and Deliverables

Task 1: Add genetics-related components to RGSM CEM

Identify a series of genetics-related components (e.g., genetic diversity of broodstock, captive demographic parameters) that inform, and are informed by, the life history characteristics of the RGSM and its environmental influences in the Middle Rio Grande. Incorporate these components into the conceptual ecological model (CEM) for the RGSM, found in Appendix B of the MRGESCP 2020 Science and Adaptive Management Plan (WEST 2020).

Objective of Task 1:

Incorporate genetics-related components into the RGSM CEM to improve utility of the model and facilitate additional linkages to Collaborative Program Objectives and RGSM recovery criteria.

Deliverable:

- 1) Schematic of RGSM CEM (provided by PST) modified to include genetics-related components and their relationships to life stages and other components in the model.
- 2) Presentation of modified schematic to SAMC, followed by discussion.

Task 2: Characterize relationships among RGSM CEM components

Indicate the level of importance (on RGSM population dynamics), level of understanding and ability to manage for each new relationship between a parent-child component pair in the RGSM CEM.

Objective of Task 2:

Characterize the added parent-child component relationships in the RGSM CEM to identify critical uncertainties for further study.

Deliverable:

- 3) Modified spreadsheet (provided by PST) of individual relationships between parent-child component pairs in the RGSM CEM with level of importance, level of understanding and ability to manage characterized as High, Medium or Low.

Task 3: Define genetics-related components added to RGSM CEM

Define the genetics-related components and any new component categories added to the RGSM CEM by expanding Tables B2 and B3 found in Appendix B of the MRGESCP 2020 Science and Adaptive Management Plan (WEST 2020).

Objective of Task 3:

Provide reference definitions for any new genetics-related components and component categories added to the RGSM CEM.

Deliverable:

- 4) Modified "Table B3_descriptions" and "Table B2_categories" included in spreadsheet (provided by PST).

Timeline and Reporting Scheduling

Task	Subtask	Deliverable	Completed By
Task 1: Add genetics-related components to RGSM CEM	NA	1. Modified schematic of RGSM CEM	September 15, 2021
		2. Presentation to SAMC	November SAMC meeting
Task 2: Characterize relationships among RGSM CEM components	NA	3. Modified table "RGSM_CEM_relationships" in provided spreadsheet	Progress to be reported to SAMC at November meeting
Task 3: Define genetics-related components added to RGSM CEM	NA	4. Modified tables "Table B3_descriptions" and "Table B2_categories" in provided spreadsheet	September 15, 2021

References:

Amec Foster Wheeler Environment & Infrastructure, Inc. 2016. Final Summary Report: Expert Peer Review of the Middle Rio Grande Endangered Species Collaborative Program's Rio Grande Silvery Minnow Genetics Project. Prepared for the U.S. Bureau of Reclamation, Albuquerque, NM.

City of Albuquerque, New Mexico Interstate Stream Commission, US Fish and Wildlife Service, and University of New Mexico. 2018. Rio Grande Silvery Minnow Genetics Management and Propagation Plan 2018-2022. City of Albuquerque BioPark, Albuquerque, NM.

City of Albuquerque, New Mexico Interstate Stream Commission, University of New Mexico, US Bureau of Reclamation, and US Fish and Wildlife Service. 2018. Rio Grande Silvery Minnow Annual Augmentation Plan 2018-2022. City of Albuquerque BioPark, Albuquerque, NM.

Western EcoSystems Technology, Inc. 2020. Middle Rio Grande Endangered Species Collaborative Program Science and Adaptive Management Plan. Prepared for the Executive Committee of the Middle Rio Grande Endangered Species Collaborative Program, Albuquerque, NM. 98 pp.